



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

SERIAL NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NO.
08/401,229	3/9/95	Tang	50169/105/ENPO

EXAMINER	
J. D. Lee	
ART UNIT	PAPER NUMBER
2874	21

DATE MAILED:

EXAMINER INTERVIEW SUMMARY RECORD

All participants (applicant, applicant's representative, PTO personnel):

- (1) Mr. Lee (examiner) (3) _____
(2) Mr. Maebius (attorney) (4) _____

Date of interview May 5, 1998

Type: ☐ Telephonic ☒ Personal (copy is given to ☐ applicant ☒ applicant's representative).

Exhibit shown or demonstration conducted: ☐ Yes ☒ No. If yes, brief description: _____

Agreement ☐ was reached with respect to some or all of the claims in question. ☒ was not reached.

Claims discussed: 79-90 (copied from US Pat 5,433,651)

Identification of prior art discussed: US 5,433,651 to Lustig et al (of record)

Description of the general nature of what was agreed to if an agreement was reached, or any other comments: proposed set of claims (attached) discussed. Because of genus/species approach and "optical coupling" definitions question, Examiner could not give definitive word that any of these claims could be allowed. But Examiner will study carefully & get back in touch with Mr. Maebius on these claims. Examiner indicated that existing claims 17-35, 39-47, 53-60 are already distinct from Lustig & could be allowed.
(A fuller description, if necessary, and a copy of the amendments, if available, which the examiner agreed would render the claims allowable must be attached. Also, where no copy of the amendments which would render the claims allowable is available, a summary thereof must be attached.)

☐ 1. It is not necessary for applicant to provide a separate record of the substance of the interview.

Unless the paragraph below has been checked to indicate to the contrary, A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION IS NOT WAIVED AND MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW (e.g., items 1-7 on the reverse side of this form). If a response to the last Office action has already been filed, then applicant is given one month from this interview date to provide a statement of the substance of the interview.

☐ 2. Since the examiner's interview summary above (including any attachments) reflects a complete response to each of the objections, rejections and requirements that may be present in the last Office action, and since the claims are now allowable, this completed form is considered to fulfill the response requirements of the last Office action. Applicant is not relieved from providing a separate record of the substance of the interview unless box 1 above is also checked.

JOHN D. LEE

PRIMARY PATENT EXAMINER

GROUP ART UNIT SET 2874

Proposed Claims

1. A chemical mechanical polisher for planarizing a film on one side of a substrate comprising at least one light source positioned to transmit light through a light-transmissive portion of a polishing pad to at least one section on the film and at least one device that monitors a dimensional change in the film based on a reflected light signal generated when light is transmitted to the section on the film.

2. The chemical mechanical polisher of claim 1, wherein the light source is capable of transmitting light during a timed interval when the section on the film is aligned with the light source.

3. The chemical mechanical polisher of claim 1, wherein the light source and device that monitors a dimensional change are an interferometer.

4. The chemical mechanical polisher of claim 3, wherein the interferometer is a laser interferometer.

5. The chemical mechanical polisher of claim 1, wherein the dimensional change is change in thickness of the film being planarized.

6. The chemical mechanical polisher of claim 1, wherein the light source produces light of at least one wavelength between about 200 and about 11,000 nanometers.

7. A process of making a planarized substrate for microelectronic devices comprising

providing a chemical mechanical polisher for planarizing a film on one side of a substrate comprising at least one light source positioned to transmit light through a light-transmissive portion of a polishing pad to at least one section on the film

and at least one device that monitors a dimensional change in the film based on a reflected light signal generated when light is transmitted to the section on the film,

planarizing a film on one side of a substrate using said chemical mechanical polisher, and
recovering the planarized substrate.

8. The process of claim 7, wherein the light source is capable of transmitting light during a timed interval when the section on the film is aligned with the light source.

9. The process of claim 7, wherein the light source and device that monitors a dimensional change are an interferometer.

10. The process of claim 9, wherein the interferometer is a laser interferometer.

11. The process of claim 7, wherein the dimensional change is change in thickness of the film being planarized.

12. The process of claim 7, wherein the light source produces light of at least one wavelength between about 200 and about 11,000 nanometers.

13. The process of claim 7, further comprising depositing at least one additional film on the substrate after a first film has been planarized and repeating the planarizing step for each additional film.

14. The process of claim 7, wherein the film is a dielectric layer, a metal layer, or a silicon layer.

15. The process of claim 14, wherein the film is SiO_2 .

16. The process of claim 7, wherein the planarized substrate is a silicon wafer, a gallium-arsenide wafer or a silicon on insulator wafer.

17. A process of making a microelectronic device, comprising

providing a chemical mechanical polisher for planarizing a film on one side of a substrate comprising at least one light source positioned to transmit light through a light-transmissive portion of a polishing pad to at least one section on the film and at least one device that monitors a dimensional change in the film based on a reflected light signal generated when light is transmitted to the section on the film,

planarizing a film on one side of a substrate using said chemical mechanical polisher,

forming at least one electrical interconnection between at least two layers of the planarized substrate to form at least one microelectronic device thereon, and

recovering the microelectronic device from the planarized substrate.

18. The process of claim 17, wherein the light source is capable of transmitting light during a timed interval when the section on the film is aligned with the light source.

19. The process of claim 17, wherein the light source and the device that monitors a dimensional change are an interferometer.

20. The process of claim 19, wherein the interferometer is a laser interferometer.

21. The process of claim 17, wherein the dimensional change is change in thickness of the film being planarized.

22. The process of claim 17, wherein the light source produces light of at least one wavelength between about 200 and about 11,000 nanometers.

23. The process of claim 17, further comprising depositing at least one additional film on the substrate after a first film has been planarized and repeating the planarizing step for each additional film.

24. The process of claim 17, wherein the film is a dielectric layer, a metal layer, or a silicon layer.

25. The process of claim 24, wherein the film is SiO_2 .

26. The process of claim 17, wherein the substrate is a silicon wafer, a gallium-arsenide wafer or a silicon on insulator wafer.

27. In a chemical mechanical polisher for planarizing a film on one side of a substrate, the improvement comprising a polishing pad having at least one section through which light can be transmitted to a portion of the film on the substrate for the purpose of monitoring a dimensional change in the film based on light reflected by the film.

28. The chemical mechanical polisher of claim 27, wherein the section in the polishing pad is transmissive to light of at least one wavelength between about 200 and about 11,000 nanometers.

29. The chemical mechanical polisher of claim 27, wherein the section in the polishing pad includes means for enhancing a light signal passing between the polishing pad and the film on the substrate.